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ABSTRACTS

from

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(Pages refer to the Japanese originals of this volume unless otherwise noticed)

On the Sugars of the Flue-cured Tobacco. (pp. 159～161): By T. NITO and T. IWASAKI. (Mito Experiment Station, Government Monopoly Bureau, Japan, Received Dec. 10, 1936.)

On the Estimation of Certain Elements with the Spectrogaph by Arc Process. (Part 2). (pp. 162～171): By K. KONISHI and T. TSUGE. (Institute of Agr. Chem., Imp. University, Kyoto. Received Dec. 8, 1936.)

Measurements of the intensities of the spectral lines of phosphor sensitized on photographic plates were carried out by means of a micro-photometer of a recording type. The intensities for the standard solutions were plotted against their concentrations, and the curves so obtained were practically straight for the concentration range 0.2～8.0% P. It was shown that the calculated amounts of phosphor contained in rice straw, wheat straw and soybean leaves were in good agreement with those determined by chemical method.

Über die Oberflächenaktivität und die Adsorbierbarkeit von Aminosäuren. VIII. Mitteilung. (S. 172～176): Von Takeo ITO. (Aus dem chemischen Laboratorium in Seidenbau-Hochschule, Kyoto. Zugeg. 8. 1. 1937.)

Es wurde früer festgestellt, dass die α-Aminomonocarbonsäuren wie Valin, Norvalin, Leucin, Norleucin u.a.m. als Kationen oder als Anionen wenn auch nicht sehr ausgeprägt oberflächenaktiv und an aktiver Kohle adsorbierbar sind. Zum Vergleichen hiermit haben wir in der vorliegenden Arbeit Versuche mit einigen Salzen von Fettsäuren und Aminen angestellt.

Adsorbens: Carbo animalis pur. sicc., Merck. Temp.: 18°

Adsorptiv		Formel	Adsorbierte Menge in Millimol/g-Kohle
n-Amylamin-Ion		$CH_3-(CH_2)_3-CH_2-NH_3^+$	0.47
Norleucin	Kation	$CH_3-(CH_2)_3-\underset{\underset{COOH}{|}}{CH}-NH_3^+$	0.45
	Zwitterion	$CH_3-(CH_2)_3-\underset{\underset{COOH}{|}}{CH}-NH_3^+$	0.57
	Anion	$CH_3-(CH_2)_3-\underset{\underset{COO^-}{|}}{CH}-NH_2$	0.29
n-Capronsäure-Ion		$CH_3-(CH_2)_3-CH_2-COO^-$	0.32

Wie aus der Tabelle ersichtlich, wird das Norleucin-Kation durch Kohle annähernd ebenso viel wie das *n*-Amylamin-Ion aufgenommen, während das Norleucin- und das *n*-Capronsäure-Anion wieder annähernd gleichmässig, und merklich schwächer als die beiden ersteren adsorbierbar sind.

Literatur.

(1) Colloidal Electrolytes, Faraday Soc., 1935, S. 200.
(2) Landolt-Börnstein-Roth-Scheel, Physik. Chem. Tab., 5. Aufl, S. 1124.
(3) Ito, J. Agricult. Chem. Soc. Japan, **8**, 910 (1932).
(4) Compt. rend , **179**, 972 (1924).
(5) Proc. Roy. Soc. London, A, **124**. 554 (1929).
(6) diese Zeitschr. **8**, 63 (1932).

Chemical Studies on Japanese Coccidae. XIII.—On the Resinous Substance of *Ceroplastes rubens* Mask. II. A New Resinic Acid—Rubenic Acid. (pp. 177～184): By M. Kawano and R. Maruyama. (Laboratory of Ohsaka Factory of Sankyo Co. Ltd., Received Dec. 10. 1936.)

Chemical Researches on the Cellulose Resources.—Part V. The α-Cellulose Contents of Various Pulp Plants. (pp. 185～190): By Kisaburo Shimbo. (The Chemical Laboratory of Forest Products, Kyoto Imperial University, Received Dec. 8, 1936.)

The α-cellulose contents of various pulp plants were determined by the chlorine dioxide method, which was modified by Yuan-Chi Tang (Cellulose

Chemie **16** (1935) 57). The ash contents as well as viscosity were determined. The results are given in the following table.

	Total Cellulose	α-Cellulose	In total cellulose (%)				Relative Viscosity
			α	β	γ	ash	
The soft woods							
1 Picea jezoensis, Carr (I)	46.77	42.18	90.18	2.88	6.94	0.33	6.0
2 Abis sachalinensis, Mast	44.16	39.89	90.33	1.16	8.51	0.32	5.5
3 Picea excelsa LK	44.37	41.00	92.41	4.12	3.47	0.34	6.0
4 Picea jezoensis, Carr (II)	46.99	42.64	90.74	2.51	6.75	0.35	7.8
5 Abies nephrolepis, Max	46.96	41.96	89.36	1.78	8.86	0.31	6.6
6 Abies holophylla, Max	42.28	38.89	91.98	2.05	5.97	0.33	6.5
7 Pinus koraiensis, Set Z	42.77	38.81	90.74	4.72	4.54	0.30	6.6
8 Pinus sylvestris, Linnaeus var. sibirica Ledeb	40.50	37.85	93.45	2.91	3.64	0.32	5.7
Mean value of the soft woods	44.35	40.40	91.15	2.77	6.08	0.33	6.3
The hard woods							
9 Populus tremula L. var. Villosa, Wesm	56.06	52.33	93.34	5.08	1.58	0.23	3.0
10 Populus laurifolia, Ledeb	41.52	37.92	91.33	6.96	1.71	0.22	4.4
11 Populus Simoni, Carr	43.68	41.08	94.05	5.33	0.62	0.36	3.3
12 Tilia amurensis, Kom	43.17	38.83	89.94	6.43	3.63	0.42	4.4
13 Betula constata Trautr	43.08	39.91	92.64	3.13	4.23	0.38	5.5
14 Quercus Mongdica, Fisch	41.00	37.50	91.46	4.41	4.13	0.29	4.9
Mean value of the hard woods (except 9)	42.49	39.05	91.88	5.25	2.86	0.33	4.5
Stalks of various agricultured crops and others							
15 Marus alba, L	40.31	38.28	94.96	2.40	2.64	0.65	4.6
16 Gossypium hirsutum, L	37.56	34.89	92.89	1.57	5.54	0.83	5.0
17 Phyllostachys bambusoides, Sieb et Zucc	40.53	38.20	94.25	2.91	2.84	0.57	5.3
18 Andropogon sorghum, Broth	41.56	39.57	95.21	3.97	6.82	0.67	6.5
19 Helianthus annuus, L	35.36	32.60	92.19	3.87	3.94	1.05	5.5
20 Saccharum officinarum, L	39.79	37.66	94.64	——	——	0.84	4.9
21 Gossypium herbaceum, L (cotton hair)	94.13	91.07	96.75	1.69	1.56	0.18	3.2
22 Sphagnum Fimbriatum, Wils	24.39	18.25	74.82	——	——	——	——

Cotton hair 21, (alcohol-benzen extract)	45.0
Pulp V.S brand	4.5
Pulp Rayonir brand	4.2

Chemical Studies on Japanese Coccidae. XIV.—On the Resinous Substance of *Ceroplastes rubens* Mask. III. A New Resinol—Rubenol. (pp. 191～199): By M. KAWANO and R. MARUYAMA. (Laboratory of Ohsaka Factory of Sankyo Co. Ltd., Received Dec. 10, 1936.)

Studies on the Phosphatides of Eggs. (pp. 200～205): By Y. MASUDA and T. HORI. (Agr. Chemical Laboratory, Hokkaido Imp. University, Received Jan. 8, 12.)

Studies on Cytochrome C. Part II.—Preliminary experiments on the synthesis of cytochrome C from protoporyhyrin. (pp. 206～207): By Hideo KATAGIRI, Kosaku MASUDA and Takeshi HIMEMOTO. (Agr. Chemical Laboratory, Kyoto Imperial University, Received Dec. 23, 1936.)

Porphyrin C was obtained from protoporphyrin in the same manner as was mentioned in the previous paper (Part I) (This Journal, **13**, 94.).

Pyridine- and nicotine-haemochromogens of the porphyrin C obtained from blood haemin, were found to give absorption bands at 550, 521 mμ and 551, 523 mμ respectively.

These haemochromogens were again found to reveal very much the same nature of cytochrome C, against air oxygen and reducig agent.

Chemical Studies on Silk Fibroin (IV).—Chemical Relation between Fibroin Components. (pp. 208～215): By Hideo KANEKO. (College of Sericulture and Silk Industry, Ueda, Received Jan. 12, 1937.)

As *o*-phthalaldehyde gives the characteristic violet colour with glycine in the presence of hydrochloric acid Zimmermann (1930) has employed this reagent for the detection of a minute amount of glycine and Abderhalden and Neumann (1936) have also used this reagent for the investigation of amino acids and polypeptides and described that by the colour produced with Zimmermann's reagent the position of glycine molecule combined in the polypeptide chain may be determined. The protein in insoluble form developes also the same colouration with this reagent as the dissolved one. The results obtained are as following:

Cocoon fibre	violet
Silk fibre partly degummed	slight violet

Silk fibre completely degummed	colourless
Silk fibre damaged by chemical reagents	slight rosa
Sericin precipitated by salts	violet
Fibroin A	violet
Fibroin B	slight rosa

From these figures sericin in natural state or precipitated form has more free ionic groups on its surface than fibroin fibre. This difference of active groups on the molecules influences on the solubility of these two proteins in water and on the physicochemical properties of the resulting solutions. The state of sericin is rather resemble in that of fibroin components, especially in fibroin A, fractionated with ammonium sulphate from fibroin sol.

The fibroin components are therefore not present in the merely physical mixture, but their grouping in fibre is by residual electric fields. According to the degree of damage the colour produced is deepened from rosa to violetish red, so we can easily detect the damage of fibroin fibre by Zimmermann's reagent. The firstly soluble component from fibroin fiber in water or acid, alkaline and salt solutions is fibroin B which is present on the outer surface and intermiceller spaces of fibroin fibre and gives reddish colour with Zimmermann's reagent.

Chemical Studies on Silk Fibroin (V).—The relative Viscosity of Fibroin Component Solutions. (pp. 216～224): By Hideo KANEKO, Chuichiro KOMATSU and Yoshio NAKAZAWA. (College of Sericulture and Silk Industry, Ueda, Received Jan. 12, 1937.)

The viscosity coefficient of solutions of silk fibroin components which disperse into Loewe's solution varies with time passing a maximum point after 2 or 3 hours. The relative viscosity of solution of fibroin A is always greater than that of fibron B components and the former shows a much more rapid rate of increase with concentration than the latter. The values of specific volumes of fibroin particles, φ and constant α caluculated from the formula of Fikentscher-Mark-Sakurada are as following:

at 14°C. Conc.=2.8%

	φ (c.c.)	α
Fibroin A	5.07	2.14
Fibroin B_I	2.50	3.73
Fibroin B_{II} and B_{III}	2.39	3.73

Fibron components form molecular aggregates in association with water molecules and this tendency to aggregate formation is reduced by rising temperature. But, as serician rapid reduction of viscosity coefficient of fibroin

A occurs at about 50°C. From the results obtained we can know that fibroin A, the main component of fibroin micelles, shows particularly many similar physico-chemical behaviours as sericin.

The Utilization of the By-products of Soy-beans. (pp. 225～235): By Yosaburo IWASA. (Dept. of Food Chemistry Osaka Municipal Hyg. Lab, Received Jan. 15, 1937.)

I. Studies on the sugars of soy-bean syrup.

Soy-bean syrup in an industrial by-product of soy-bean oil which is produced by alcohol abstraction.

This syrup contains the following components:

Water	17.43%	Carbohydrate	70.09%
Protein	5.20%	Ash	5.00%
Fat	2.28%		

The carbohydrates are analysed as follows:

direct reduced sugar (Glucose)	2.86%
indirect reduced sugar (invert sugar)	41.73%
other carbohydrates	25.50%

Monosaccharose are detected by the following methods.

i) The colour reaction method.
Pentose+, Methylpentose+, Hexose (Aldose, Ketose)+, Glucuronic acid+.

ii) The osazon method.

Glucose-Phenylhydrazon		F.P.	210°C
Levulose-	„	„	„
Galactose-	„	„	184°C
Rhamnose-	„	„	183°C
Arabinose-	„	„	166°C

Hitherto, the investigations of others have failed to reveal the presence of monosaccharose in soy-bean carbohydrates, but the author has discovered their presence by the above mentioned methods.

Probably, these sugars are produced by the hydration of cane sugar, stachyose and saponin in the industrial making of the syrup.

Disaccharose (cane sugar) and tetrasaccharose (stachyose) are both in soybean syrup.

II. In his studies of soy-bean syrup the author detected the presence of saponin.

It indicated a Z.P. of 220～225°C and Lieberman's reaction. By hydration it became rhamnose, galatose, arabinose, glucuronic acid and sapogenin.

III. Stndies on the fermentation of soy-bean syrup.

i) As a method to utilize this syrup alcohol fermentation was tried. The sugar solution given below was used:

acidity 5 cc=0.8 cc $\frac{N}{10}$ NaOH, PH=6.0,

direct reduced sugar 0.98%

indirect reduced sugar 6.60%

Microbs		dry wt. of mcirobs	acidity	alcohol (Vol %)
Mucor javanicus	A	0.5872	0.75	——
	B	0.6950	0.80	——
Mueor hiemalis	A	0.7764	0.60	0.27
	B	0.5958	0.65	0.40
Sacch. Saké	A	0.4464	1.55	2.02
	B	0.3724	1.60	2.16
Sacch. cerevisiae	A	0.2776	1.45	trace
	B	0.3632	1.50	1.00
Sacch. ellipsoideus	A	0.3244	1.60	4.18
	B	0.5278	1.60	3.35
Asp. niger	A	2.0730	2.75	0.07
	B	0.5084	1.95	0.13
Willia anomala	A	0.6884	1.95	trace
	B	1.0860	2.50	1.54
Rhiz. Oryzae	A	1.5740	1.55	trace
	B	0.9070	1.80	1.54

Table A indicates that microbs cultivate in a sugar solution, when left alone and remain at 30°C for 20 days.

B indicates that microbs cultivate in a sugar solution and remain at 30°C for 20 days, if agitated once every 24 hours.

ii) In method A, Sacch. ellipsoideus produced more alcohol than the other microbs.

Therefore, the author tried the influence of the activator and PH in the alcohol fermentation of Sacch. elliposideus, as follows:

With activator			dry wt. of yeast	acidity	alcohol (vol %)
Without activator		PH=6.0	0.2102	1.60	4.00
HCl	0.1 %	PH=2.1	0.2702	2.40	4.43
HCl	0.05%	PH=4.8	0.2282	1.95	2.86
KOH	0.1 %	PH=8.0	0.2520	1.30	2.37
KOH	0.5 %	PH=8.8	0.2450	1.00	3.71
$CuSO_4$	0.1 %		0.0450	1.05	0.27
	0.01%		0.3274	1.40	4.29
Fe_2Cl_6	0.1 %		0.3094	2.30	3.85
	0.01%		0.2436	1.70	4.18

$MnSO_4$	0.1 %	0.2480	1.90	3.93
	0.01%	0.2422	1.70	3.64
$ZnSO_4$	0.1 %	0.2188	2.05	3.64
	0.01%	0.2194	2.00	4.58
$CoCl_2$	0.1 %	0.2458	2.05	4.95
	0.01%	0.2350	1.85	3.64

This experiment proved that 0.1% of $CoCl_2$ is better than the other activators.

Agar Solidity Tester. (pp. 236～240): By Arao Itano and Yasuhiko Tsuji. (Ohara Agricultural Institute, Kurashiki, Japan, Received Feb. 15, 1937.)

A new apparatus for measuring the solidity which was proposed by Itano is described in detail together with the experimental results, indicating that the relative solidity of agar gels can be accurately determined as close as 0.1 percent difference of agar content; the solidity of agar gels was tested under different condition viz. temperature, commercial brand of agar of different concentrations ; it was found that lower the temperature, the solidity increases if the other conditions are the same, and the solidity differs with different brand of agar. This apparatus can be used for the solidity measurement of other materials as well.
